

REMARKS

Claims 1-18 are all the claims presently pending in the application. Claims 1, 5, 8 and 9 have been amended to more particularly define the invention.

It is noted that the claims amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims, or for any statutory requirements of patentability. Further Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1, 2, 8 and 9 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Claims 1-18 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Tischler et al. (U.S. Patent Application Publication No. 2002/0028314; hereinafter "Tischler").

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention of exemplary claim 1, provides a method of producing a Group III nitride compound semiconductor substrate including forming a first Group III nitride compound semiconductor layer by a halide vapor-phase epitaxy method at a temperature of from 800°C to 900°C directly on a silicon (Si) substrate or after forming a buffer layer on the silicon substrate (e.g., see Application at page 3, line 24 through page 4, line 8). This feature is important for relaxing the stress between the silicon substrate and the first Group III nitride compound semiconductor so that the stress is substantially absent (see Application at page 6, lines 5-18).

II. THE 35 U.S.C. 112, FIRST PARAGRAPH, REJECTION

The Examiner has rejected claims 1, 2, 8 and 9 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner alleges that there is no support for “*a halide vapor-phase epitaxy method*”, as recited in the claimed invention, because the Application teaches that “the HVPE process utilizes HCL etchant in carrying out the claimed “halide” process. The Examiner, however, is clearly incorrect.

Indeed, the Application clearly discloses that the silicon substrate (e.g., 1, Applicants point out that reference numerals are merely provided herein for exemplary purposes for the convenience of the Examiner and are not meant to limit the scope of the claimed invention in any manner) having the AlGaN layer (e.g., 2) and the GaN layer (e.g., 3) is set in a halide VPE apparatus. While the halide vapor-phase epitaxial growth of a GaN layer (e.g., 10) is performed from an upper surface of the silicon substrate (e.g., 1) by GaCl and ammonia, a rear surface of the silicon substrate (e.g., 1) is gas-etched with hydrogen chloride (e.g., see Application at page 10, lines 8-20).

The Application teaches two separate and distinct steps of forming a first Group III nitride compound semiconductor layer by a halide vapor-phase epitaxy method and removing substantially a whole of said silicon substrate by etching a rear surface of said silicon substrate. As is clearly disclosed in the Application, the hydrochloric acid (HCl) is used to etch the rear surface of the silicon substrate, not to form the first Group III nitride compound semiconductor layer, as alleged by the Examiner.

Indeed, the first Group III nitride compound semiconductor layer is formed by a halide vapor-phase epitaxy method using GaCl, which is a halide. Thus, the Application clearly provides support for forming a first Group III nitride compound semiconductor layer by a halide vapor-phase epitaxy method, as recited in the claimed invention.

Therefore, Applicants request the Examiner to reconsider and withdraw this rejection.

III. THE PRIOR ART REJECTION

The Examiner alleges that Tischler teaches the claimed invention of claims 1-18.

Applicants submit, however, that Tischler does not teach or suggest each and every feature of the claimed invention.

That is, Tischler does not teach or suggest “*forming a first Group III nitride compound semiconductor layer by a halide vapor-phase epitaxy method at a temperature of from 800°C to 900°C directly on a silicon (Si) substrate or after forming a buffer layer on said silicon substrate*”, (emphasis added) as recited in claim 1.

The Examiner attempts to rely on paragraphs [0002]-[0021] of Tischler to support his allegation. The Examiner, however, is clearly incorrect.

That is, nowhere in this passage (nor anywhere else for that matter) does Tischler teach or suggest forming a first Group III nitride compound semiconductor layer by a halide vapor-phase epitaxy method at a temperature of from 800°C to 900°C directly on a silicon (Si) substrate or after forming a buffer layer on the silicon substrate. Indeed, Tischler does not teach the specific temperature range recited in the claimed invention.

The Application clearly discloses using a temperature as low as possible (e.g., a temperature of from 800°C to 900°C) in the first layer forming method so that a chemical reaction between the silicon substrate and the Group III nitride compound semiconductor layer can be restrained from being caused by stress (e.g., see Application at page 7, line 20 through page 8, line 5).

In stark contrast, Tischler specifically teaches that the GaN is grown at a temperature between 1000°C to 1100°C (see Tischler at paragraph [0050]).

Therefore, Applicants submit that Tischler does not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

IV. FORMAL MATTERS AND CONCLUSION


In view of the foregoing, Applicants submit that claims 1-18, all of the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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